

# **Agriculture and Soils**



## 6.4 AGRICULTURE AND SOILS

This section describes the agriculture and soil resources in the vicinity of the Morro Bay Power Plant (MBPP). Based on the finding that MBPP has operated and coexisted without incident in proximity to agricultural uses since operations began in the 1950s, and because the new generating facility will be placed within the existing MBPP industrial site, no agricultural lands or soil uses will be affected by the Project. Further, the new operations will result in lower overall levels of air emissions, a positive effect relative to the relationship between air quality and crop production (see Section 6.2 - Air Quality). As a result, the Project will not result in significant impacts to agriculture and soils.

Beneficial aspects of the Project relative to agriculture and soils are:

- Ground disturbance is confined to an existing industrial site.
- Project design features assure that ground-level concentrations of air pollutants will have no significant impacts on agriculture and soil resources (see Section 6.2 - Air Quality).

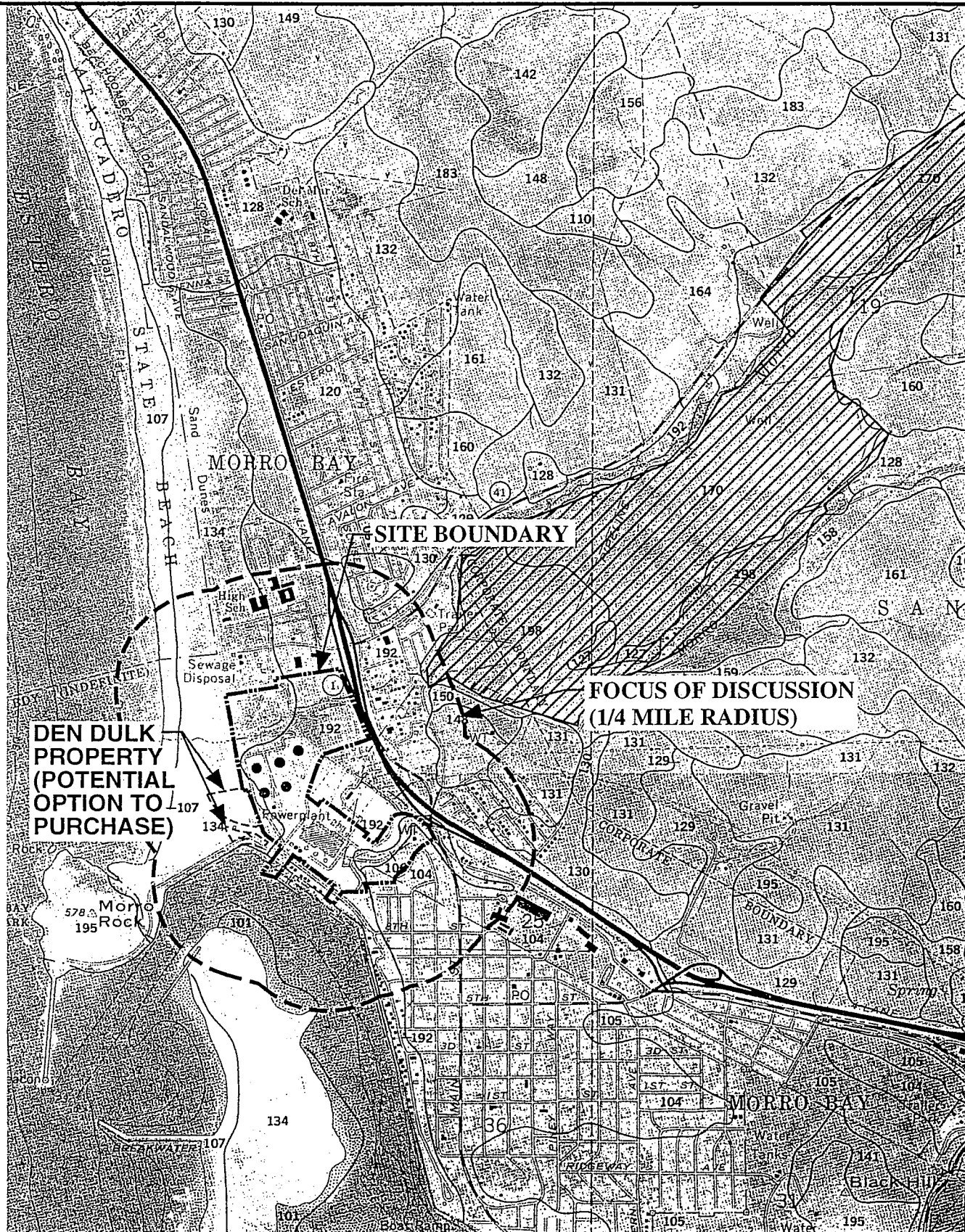
### 6.4.1 EXISTING CONDITIONS

The MBPP is located about 12 miles northwest of San Luis Obispo, California, in San Luis Obispo County, in the City of Morro Bay. The plant is situated west of Highway 1, near Morro Bay Harbor and east of Estero Bay. The area includes light industry, commercial operations and marine, recreational and residential uses.

The Project area is along the Central California coast, with the Pacific Ocean to the west, and rolling hills and narrow valleys to the east. The coastal climate is cool and moist in winter, and warm/moderate and dry in summer, with typical atmospheric marine layers. Information on the geology of the Project area is included in Section 6.3 - Geologic Hazards and Resources. Since the Project represents construction and operations at an existing industrial facility, this section focuses on agricultural and soil resources within a 1/4-mile radius of the MBPP site boundary.

#### 6.4.1.1 Soil Resource

United States Department of Agriculture, Soil Conservation Service (SCS) maps identify soil types and their distribution in the MBPP area (see Figure 6.4-1 and Table 6.4-1) (SCS, 1984). As shown, general soil types in the area include sand dunes, alluvial fan soils, wind-blown deposits, and surficial soils capping local hills and mountains. In general, the MBPP site is situated on the Salinas soil type. These soils tend to be very deep, exhibit nearly level to moderately sloping



**LEGEND**

 PRIME AGRICULTURAL LAND

0 2,000 4,000 FEET  
SCALE

REFERENCE: U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, SOIL SURVEY OF SAN LUIS OBISPO COUNTY, MORRO BAY NORTH AND SOUTH 7.5 MINUTE QUADRANGLES, 1979.

**SOIL UNIT LOCATION MAP**

DUKE ENERGY MORRO BAY LLC  
MORRO BAY POWER PLANT

**TRC**

**FIGURE 6.4-1**

**TABLE 6.4-1**  
**SUMMARY OF SOIL PROPERTIES**  
**IN VICINITY OF MORRO BAY POWER PLANT**

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MAP SYMBOL(1)	SOIL NAME	DEPTH (inches)	USDA TEXTURE	% SLOPE	USCS CLASSIFICATION(2)	PERMEABILITY	DRAINAGE	EROSION HAZARD RATING	EROSION FACTORS(3)			LAND CAPABILITY(4)
									K	T		
192	Psamments and Fluvents	--	Sand and loamy sand	--	--	Moderately rapid or rapid	Excessively drained	Moderate - water	--	--		VIw-2(14) Irrigated and nonirrigated
104	Baywood	0-13 13-90	Fine sand Fine sand, sand	2-9	SP-SM, SM SP-SM, SM	Rapid (6.0 to 20 in/hr)	Excessively drained	Medium - water; High - soil	0.15 0.15	5		IVs-1(14) Irrigated Vle(14) Nonirrigated
106	Baywood	0-13 13-90	Fine sand Fine sand, sand	15-30	SP-SM, SM SP-SM, SM	Rapid (6.0-20 in/hr)	Excessively drained	Medium - water High - soil	0.15 0.15	5		IVs-1(14) Irrigated Vle(14) Nonirrigated
130, 131	Diablo Clay	0-38 38-58 58	Clay Silty clay, clay, clay loam Weathered bedrock	9-15	CL, CH CL, CH --	Slow (0.06-0.2 in/hr)	Well drained	Moderate - water	0.24 0.24 --	3		IIIe-5(15) Irrigated and Nonirrigated
130, 131	Cibo Clay	0-31 31-39 39	Clay Clay loam, clay Unweathered bedrock	15-30	CH CL, CH --	Slow (0.06-0.2 in/hr)	Well drained	Moderate - water	0.20 0.17 --	2		IVe-5(15) Nonirrigated
134	Dune land	--	Sand	--	--	Very rapid	--	High - soil	--	--		VIIIe

Source: U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of San Luis Obispo County, California, 1984.

-- Not available.

(1) Soil numbers refer to numbers shown in Figure 6.4-1. Map symbols 130 and 131 refer to both Diablo and Cibo Clays.  
(2) Unified Soil Classification System.

(3) K is a measure of relative susceptibility to sheet and rill erosion by water. It ranges from 0.02 to 0.69, with lower values representing a lower susceptibility to erosion. T represents soil loss tolerance, defined as the maximum amount of erosion at which the quality of the soil as a medium for plant growth can be maintained. Values range from 1 to 5 (tons per acre per year), with 5 representing soils less sensitive to degradation.

(4) An indication of the suitability of soils for most kinds of field crops. Capability classes are I through VIII. Subclasses are letters e, w, s, or c. Units are 0 through 9.

**TABLE 6.4-1**  
**SUMMARY OF SOIL PROPERTIES**  
**IN VICINITY OF MORRO BAY POWER PLANT**  
**(Continued)**

Page 2 of 2

MAP SYMBOL(1)	SOIL NAME	DEPTH (inches)	USDA TEXTURE	% SLOPE	USCS CLASSIFICATION(2)	PERMEA-BILITY (0.6-2.0 in/hr)	DRAINAGE	EROSION HAZARD RATING	EROSION FACTORS(3)		LAND CAPABILITY(4)
									K	T	
148	Lodo Clay Loam	0-12 12	Clay loam Unweathered bedrock	15-30	CL	(0.6-2.0 in/hr)	Excessively drained	High - water	0.28	1	Vle(15) Nonirrigated
107	Beaches	--	Sand	--	--	Very rapid	--	High - soil	--	--	VIIIw
101	Aquolls, saline	--	Silty clay loam, clay	--	--	Slow	--	--	--	--	VIIIw(14) Nonirrigated
160	Los Osos Loam	0-14	Loam	15-30	ML, CL-ML	Slow	Well drained	High - water	0.37	2	Ive-1(15) Nonirrigated
		14-32	Silty clay, clay loam, clay		CL, CH				0.28		
		32-39	Sandy loam, clay loam		SC, SM-SC, CL, CL-ML				0.28		
		39	Weathered bedrock		--				--		
198	Salinas silty clay loam	0-29	Silty clay loam	2-9	CL	Moderately slow	Well drained	Slight or moderate - water	0.37	5	Ile-1(14) Irrigated
		29-72	Stratified loam to silty clay loam		CL-ML, CL				0.43		Ile-1(14) Nonirrigated
150	Lodo Clay Loam	0-12 12	Clay loam Unweathered bedrock	50-75	CL --	Moderate	Excessively	Very high - water	0.28	1	Vlle(15) Nonirrigated

98-710/Rps/AFC(eta)/Thick/Figs (10/13/00/mms)

Source: U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of San Luis Obispo County, California, 1984.

-- Not available.

(1) Soil numbers refer to numbers shown in Figure 6.4-1. Map symbols 130 and 131 refer to both Diablo and Cibo Clays.

(2) Unified Soil Classification System.

(3) K is a measure of relative susceptibility to sheet and rill erosion by water. It ranges from 0.02 to 0.69, with lower values representing a lower susceptibility to erosion. T represents soil loss tolerance, defined as the maximum amount of erosion at which the quality of the soil as a medium for plant growth can be maintained. Values range from 1 to 5 (tons per acre per year), with 5 representing soils less sensitive to degradation.

(4) An indication of the suitability of soils for most kinds of field crops. Capability classes are I through VIII. Subclasses are letters e, w, s, or c. Units are 0 through 9.

topography, and are somewhat poorly to well-drained silty clay loam and sandy clay loam soils formed on alluvial plains. Artificial fill is also present throughout the MBPP site. These earth materials consist of a heterogeneous mixture of fill materials, including well-compacted sand and silts. This fill was spread over the surface of what is now MBPP and the surrounding tidal flats by the United States Navy in 1941 and 1942. The fill raised the elevation of the MBPP site and the tidal flats to an elevation of about 15 feet above mean sea level (msl). The average depth of fill at MBPP is approximately 8 feet.

The predominant soils within a 1/4-mile radius of MBPP are sand, fine sand, loamy sand, clay loam and clay. As shown in Figure 6.4-1, representative soils include:

<u>Soil Type</u>	<u>Soil Mapping Unit No.</u>
Baywood fine sands	104 and 106
Dune lands	134
Psamments and fluvents	192
Diablo and Cibo clays	130 and 131
Lodo clay loam	148 and 150
Beaches	107
Aquolls and saline	101
Los Osos loam	160
Salinas silty clay loam	198

Note: See Figure 6.4-1 and Table 6.4-1 for the location and more detailed information of these soil types in the Project area.

The Baywood fine sands are very deep, somewhat excessively drained soils found on stabilized sand dunes near the coast and formed in deposits of windblown sand. Permeability of this soil is rapid, and the available water capacity is low. Dune lands consists of hilly areas along the coast that are composed of sand-sized particles that shift with the wind. The Psamments and Fluvents soils consist of excessively drained, stratified deposits of sand and loamy sand that may contain thin layers of sandy loam, silt or gravel. Permeability of this soil is moderately rapid or rapid, and available water capacity is low to very low.

The Diablo and Cibo clays are found on low-lying foothills and mountains. Diablo soil differs from Cibo soil by being deep, having a darker surface layer, and overlying softer, weathered rock. Diablo soils are well drained, with slow permeability and moderate to very high available water

capacity. Cibo soils are well drained, with slow permeability and very low to moderate available water capacity. The Lodo clay loam is a shallow, somewhat excessively drained, moderately steep soil found on foothills and mountains. Permeability of this soil is moderate, and the available water capacity is very low to low.

The Beaches map unit consists of narrow, sandy beaches along the ocean. Permeability of this unit is very rapid, and the available water capacity is low or very low. The Aquolls, saline soil, is found on the tidal marsh in Morro Bay and has slow or very slow permeability. The Los Osos loam is found on foothills and mountaintops. Permeability of this unit is slow, and available water capacity is low or moderate. The Salinas silty clay loam is found on alluvial fans and plains and formed in alluvium that has weathered from sedimentary rocks. Permeability of this soil is moderately slow, and the available water capacity is high or very high.

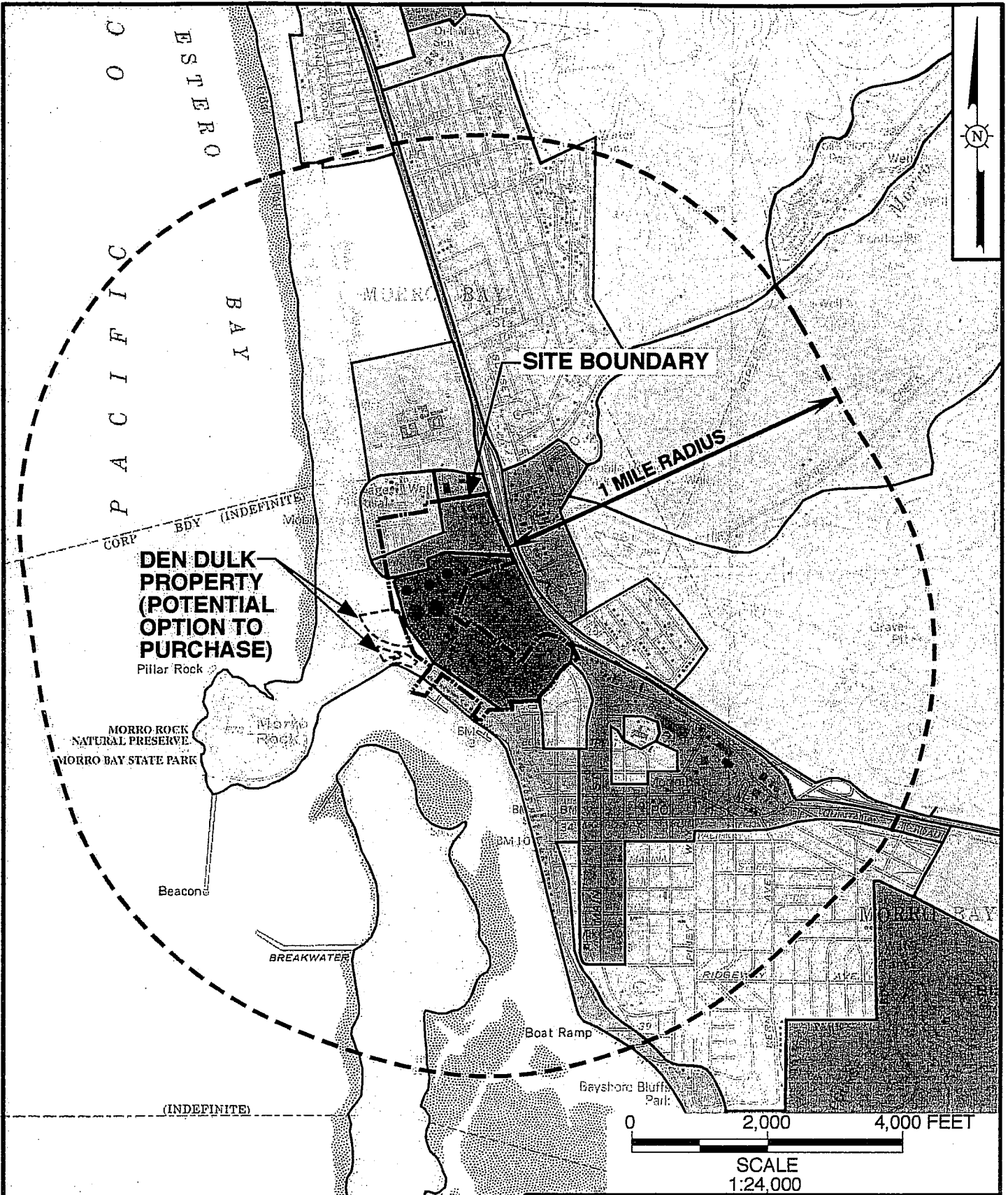
#### 6.4.1.2 Agriculture and Prime Farmland

Land use at MBPP is classified as Coastal Dependent Industrial. Adjacent land uses include commercial fishing and light industrial (City of Morro Bay, 1997). Information on land use at the Project site and surrounding areas is presented in Section 6.9 - Land Use.

Agricultural lands, which produce primarily corn, beans, avocados and dry farming crops, are located one-half to three miles east of the power plant, in the Chorro and Morro Valleys and in the Morro Highlands (City of Morro Bay, 1988; 1997). Livestock also graze the nearby hillsides north of MBPP (Pacific Gas & Electric Company [PG&E], 1997). The existing agricultural land uses, as well as other existing land uses within a 1-mile radius of MBPP are shown in Figure 6.4-2. The main irrigation source for agricultural areas in the coastal part of San Luis Obispo County has generally been deep wells (SCS, 1984).

Prime farmlands are located one-half mile to the northeast of MBPP (see Figure 6.4-1), according to a review of Important Farmland Maps compiled by the California Department of Conservation (CDC), Farmland Mapping and Monitoring Program (CDC, 1996). The MBPP site is not located on land designated as Prime Farmland, farmland of "statewide importance," or "unique" farmland (see Agricultural Land Use Map, Figure 6.4-2). In addition, as discussed in Section 6.4.1.1, the MBPP site was covered by artificial fill by the United States Navy in the early 1940's. Also, soil mapping units within the Project area (104, 106, 134 and 192) do not meet the criteria for "prime





**LEGEND**

	AGRICULTURE - ROW CROPS/ ORCHARDS		BEACH/RECREATION
	AGRICULTURE - OPEN SPACE/GRAZING		POWER PLANT
	INDUSTRIAL		RESIDENTIAL
	PARK		COMMERCIAL
	SCHOOL		VISITOR SERVICES

SOURCES: USGS 7.5 MINUTE TOPOGRAPHIC MAP OF MORRO BAY NORTH AND MORRO BAY SOUTH, CALIFORNIA DATED 1993 AND 1994.

**EXISTING AGRICULTURE / LAND USES**

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TRC

**FIGURE 6.4-2**



farmland" or farmland of "statewide importance" as outlined in the United States Department of Agriculture Land Inventory and Monitoring Project for the coastal part of San Luis Obispo County (CDC, 1995).

#### 6.4.2 IMPACTS

Significance criteria were determined based on California Environmental Quality Act (CEQA) Guidelines, Appendix G, Environmental Checklist Form (approved January 1, 1999) and on performance standards or thresholds adopted by responsible agencies, including the 1984 San Luis Obispo County Soil Survey. An impact may be considered significant if the Project results in:

- Substantial soil erosion or loss of topsoil.
- Destruction of available agricultural land or agricultural activities in the Project area.
- Degradation or loss of agricultural land productivity.
- Alteration of agricultural land characteristics due to plant air emissions.
- Conversion of Prime or Unique farmland, or farmland of statewide importance, to nonagricultural use.
- Conflict with existing zoning for agricultural use, or a Williamson Act Contract.
- Changes that could individually or cumulatively result in loss of farmland to nonagricultural use.

##### 6.4.2.1 Construction Impacts

Construction activities can have short-term effects on soil resources, including increased soil erosion. The magnitude, extent, and duration of this construction-related impact depends on various factors including the method, duration, and time of year of construction. Nearby agricultural characteristics and productivity could be impacted by increased windblown dust during Project construction and demolition activities. However, Project design features will reduce windblown dust during construction and demolition, through moisture-conditioning of soils during grading (see Section 6.4.2.4). Further, potential soil erosion will be minimized through implementation of soil erosion control measures (see Section 6.4.2.4). Figures 6.4-3 and 6.4-4 provide the Project's conceptual interim grading and erosion control plan and the conceptual grading and drainage plan, respectively. As a result, there will be no significant impacts from Project construction.

The Project is being designed to balance the amount of cut and fill during construction (see Chapter 8.0 - Engineering). Therefore, it is expected that only minor import of select material (e.g., aggregate for base material), will be required. No export of excess soil is expected.

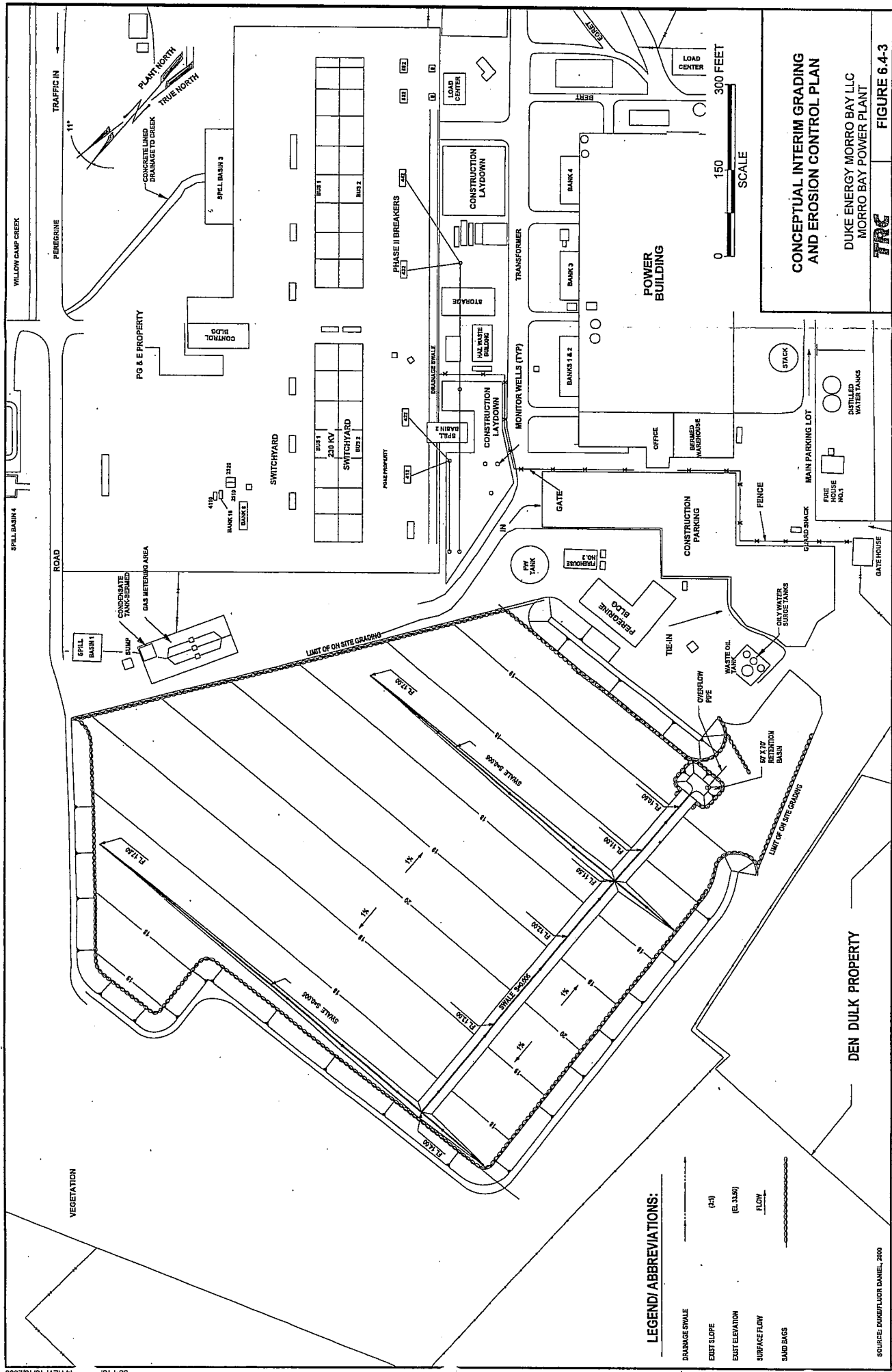
#### 6.4.2.2 Operations and Maintenance - Related Impacts

Soil resource impacts could be significant if specially designated agricultural lands were altered in character to the point that the disturbed area no longer exhibits characteristics of the special designation. Since the Project includes the placement of a new generating facility within existing MBPP property, no agricultural land uses will be directly affected by the Project.

Federal and state ambient air quality standards have been established to protect not only human health, but to prevent damage to plants and wildlife in both natural and agricultural ecosystems. The two criteria pollutants associated with emissions from the Project with the greatest potential for effects on these ecosystems are ozone ( $O_3$ ) and nitrogen dioxide ( $NO_2$ ). Only  $NO_2$  will be emitted directly, generated by the combustion of fuels. Ozone is generated over many hours and miles by a complex series of chemical reactions between nitrogen oxides ( $NO_x$ ) and reactive organic compounds (ROC). As discussed below, potential effects of Project emissions on agricultural or natural plants, or on wildlife, will be below a level of significance. Additional detail is provided in Section 6.2.2.2 of Air Quality.

For both  $O_3$  and  $NO_2$ , national secondary ambient air quality standards, specifically designated to protect against effects other than human health, were set equal to primary ambient air quality standards. Studies have shown that concentrations of these pollutants in excess of ambient air quality standards are needed to produce significant impacts on sensitive plants (Heck and Brandt, 1977). For example, the lowest 4-hour average  $NO_2$  concentration needed to affect sensitive plants is 3,760 micrograms per cubic meter ( $\mu g/m^3$ ). The California 1-hour  $NO_2$  ambient air quality standard is only 470 microgram per centimeter ( $\mu g/cm$ ) (United States Environmental Protection Agency, 1980). Based on results of the air quality analysis, maximum ground-level ambient concentrations of  $NO_2$  due to Project operations will be lower than ambient air quality standards. Therefore no significant impact on agricultural or natural plant species will occur from operation of the Project.

Similarly, concentrations higher than ambient air quality standards were needed before showing effects on animals. For example, 940  $\mu g/m^3$  of  $NO_2$  was used for 4 hours to degranulate lung mast cells in rats (Coffin and Stokinger, 1977). As discussed in Section 6.2.2, the maximum ground-level ambient air quality concentrations of  $NO_2$  expected to result from the Project are substantially lower than ambient air quality standards. Therefore, no significant impact on wildlife or domestic animal species will occur from operation of the Project.



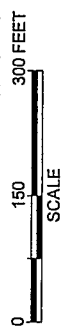
**LEGEND/ ABBREVIATIONS:**

- SWALE SAND
- (2:1) EXIST SLOPE
- (E. 33.50) EXIST ELEVATION
- SURFACE FLOW
- SAND BAGS

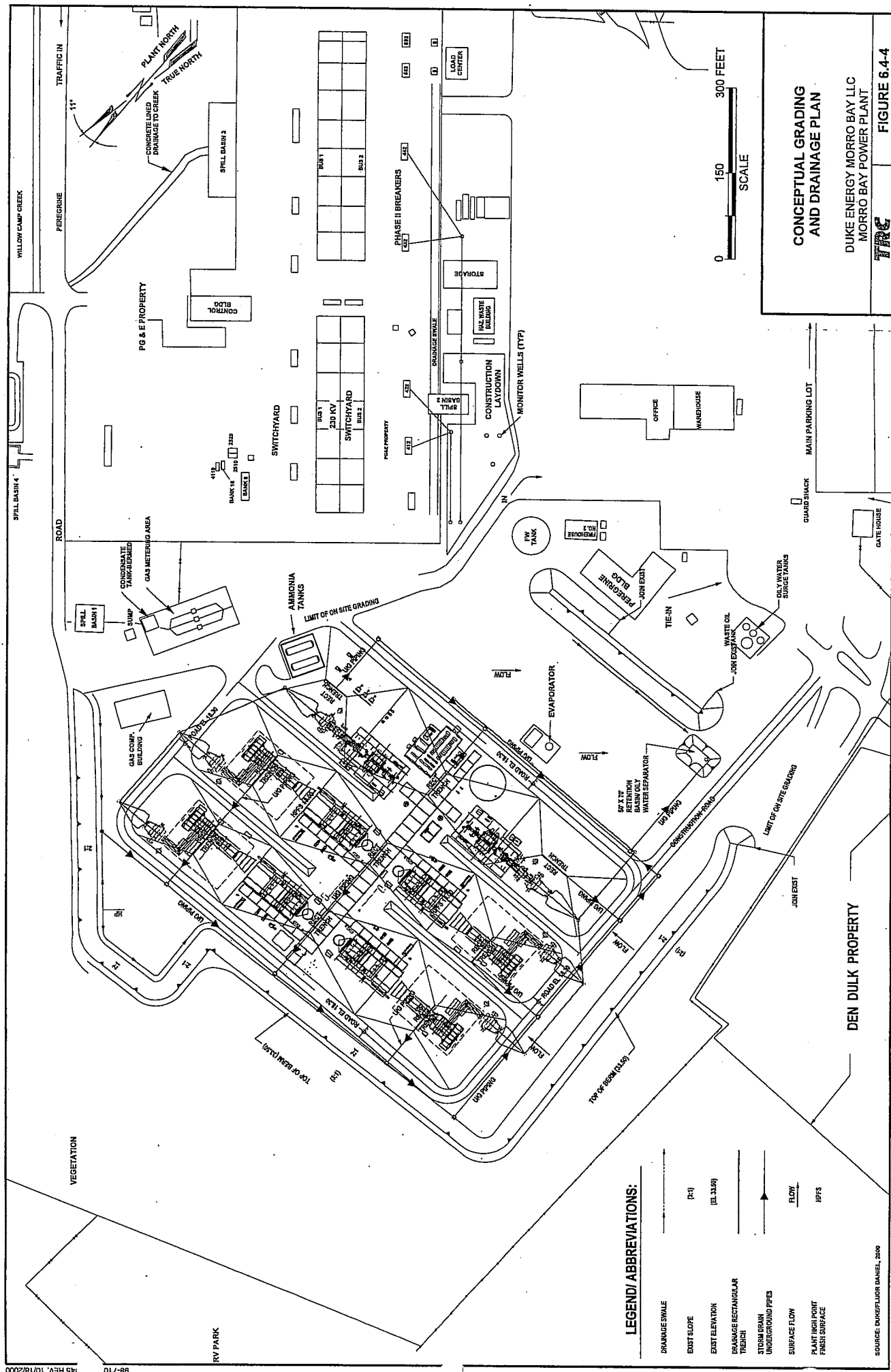
**CONCEPTUAL INTERIM GRADING AND EROSION CONTROL PLAN**

DUKE ENERGY MORRO BAY LLC  
MORRO BAY POWER PLANT

FIGURE 6.4-3











Nearby agricultural characteristics and productivity could be impacted by air emissions from operation of the Project. The air quality analysis demonstrates that the Project will not result in significant impacts to air quality or nearby agricultural uses (see Section 6.2 - Air Quality). Therefore, the characteristics of productivity of agricultural lands near MBPP will not be significantly impacted by construction or operation of the Project.

#### 6.4.2.3 Cumulative Impacts

The MBPP has operated and coexisted in proximity to agricultural properties since the plant began operation in the 1950s. With continued operations under current regulatory oversight by the San Luis Obispo County Air Pollution Control District, cumulative plant air emissions will not adversely impact agricultural use. Air emission control equipment utilized throughout MBPP have and will continue to be implemented to reduce potential cumulative impacts to air quality during plant operations, as detailed in Section 6.2 - Air Quality.

As shown in Table 6.1-1 (Section 6.0 - Environmental Information), there are also several offsite land development projects in the vicinity of MBPP. Since these projects are offsite, they have no bearing on the Project's soils and agricultural resources impacts. Because the Project and the fuel oil tank demolition will not impact soils or agricultural resources, there will be no cumulative impacts to soils and agricultural resources from the onsite and offsite projects.

#### 6.4.2.4 Project Design Features

The following are design and/or operational features of the Project that have been incorporated into the Project to avoid potentially significant environmental impacts:

- A detailed Erosion Control Plan will be developed prior to Project construction.
- The plan will include various sediment control measures (e.g., use of protective coverings, culverts, detention basins) appropriate for the site.
- A construction grading plan will be prepared in accordance with local guidelines and the Storm Water Pollution Prevention Plan.
- The grading plan which will include best management practices to reduce potential for soil erosion.
- Soils will be moisture-conditioned during grading to minimize windblown dust, which could adversely impact local agricultural areas.
- Air emission control equipment will be installed to reduce power plant emissions.

Through the implementation of the above erosion control measures, soil erosion from wash and water will be controlled to a de minimus level.

#### 6.4.3 MITIGATION MEASURES

Based on the analysis of the impacts and the design and operational features incorporated into the Project, no mitigation measures are required.

#### 6.4.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Based on the above analysis of impacts and the design and operational features incorporated into the Project, no significant unavoidable adverse impacts will occur to agriculture and soils due to construction or operation of the Project.

#### 6.4.5 LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS) COMPLIANCE

LORS pertaining to agriculture and soils are described in Section 7.5.4, and listed in Table 6.4-2 along with names of the administrative agencies and the project's approach to compliance.

Construction and operation of the Project will comply with applicable LORS related to agriculture and soil issues through a three-fold process including construction and operation Storm Water Pollution Prevention Plans, a construction grading and drainage plan, and a comprehensive erosion control plan. These measures simultaneously satisfy appropriate local ordinances and state regulations, as summarized in Section 7.5.4 and Table 7-1. No specific permits are required that are related to agriculture and soils for the project.

#### 6.4.6 REFERENCES

California Department of Conservation (CDC). Division of Land Resource Protection. *Farmland Mapping and Monitoring Program*. San Luis Obispo County Important Farmland Map. 1996.

CDC. *Farmland Mapping and Monitoring Program*. Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance, San Luis Obispo County. 1995.

City of Morro Bay. General Plan. 1988.

City of Morro Bay. Zoning Ordinance. 1997.

Coffin, D.L. and H.E. Stokinger. "Biological Effects," Chapter 5 in *Part B - Effects on Biological Systems, Volume II - The Effects of Air Pollution, Air Pollution* (Third Edition), edited by A.C. Stern. Academic Press, New York. 1977.

Heck, W.W. and C.S. Brandt. "Effects on Vegetation: Native, Crops, Forests," Chapter 4 in *Part B - Effects on Biological Systems, Volume II - The Effects of Air Pollution, Air Pollution* (Third Edition), edited by A.C. Stern. Academic Press, New York. 1977.

**TABLE 6.4-2**  
**AGRICULTURE AND SOILS LORS AND COMPLIANCE**

APPROACH TO COMPLIANCE	AFC SECTION	JURIS- DICTION	LORS/AUTHORITY	ADMINISTERING AGENCY	REQUIREMENTS/ COMPLIANCE
Erosion Control Plan, Construction Grading Plan, moisture conditioning of soils. Air emission control equipment.	Sections 6.4.2.1, 6.4.2.4 Pages 6.4-4, 6.4-6	Federal	Federal Water Pollution Control Act of 1972; Clean Water Act of 1977 (including 1987 amendments).	Central Coast RWQCB under direction of SWRCB.	Meet discharge requirements relative to sediment due to accelerated erosion.
	Sections 6.4.2.1, 6.4.2.4 Pages 6.4-4, 6.4-6		U.S. Department of Agriculture, Soil Conservation Service (SCS), <i>National Engineering Handbook</i> (1983) §2 and 3.	National Resources Conservation Service (formerly Soil Conservation Service).	Implement standards for planning, design and construction of soil conservation practices.
Submission of AFC.	Section 6.4 Pages 6.4-1 through 6.4-7	State	PRC §25523(a); CCR §1752, 1752.5, 2300-2309 and Chapter 2, Subchapter 5, Article I, Appendix B, Part (i)	California Energy Commission.	Submission of information to Commission concerning potential environmental impacts.
Operate within existing site.	Sections 6.4.2.2, 6.4.2.3 Pages 6.4-4 through 6.4-6		PRC §21000 et seq.; Guidelines for Implementation of CEQA, 14 CCR §15000-15387, Appendix G.	California Energy Commission.	Evaluate erosion or siltation and conversion of agricultural lands.
Implementation of Erosion Control Plan, construction grading plan, moisture conditioning of soils.	Sections 6.4.2.1, 6.4.2.2, 6.4.2.4, 6.5.2.2.4 Pages 6.4-4 through 6.4-6, 6.5-24		California Porter-Cologne Water Quality Control Act of 1972; California Water Code §13260-13269; 23 CCR Chapter 9.	California Energy Commission; Central Coast RWQCB; SWRCB.	Protect water quality by appropriate design, sizing and construction of erosion and sediment controls. Obtain waste discharge requirements for potential surface water pollution from project area run-off.
Implementation of construction grading plan.	Section 6.4.2.4 Page 6.4-6	Local	Morro Bay Grading Ordinance.	Commission delegation to Morro Bay.	Comply with grading requirements.
	None applicable.	Industry	None applicable.	None applicable.	None applicable.

98-710/Rps/AFC(text)/Tbils&Figs (10/13/00/mc)

Pacific Gas and Electric (PG&E). *Application for Authorization to Sell Certain Generating Plant and Related Assets* (Application No. 96-11-020). August 1997.

United States Department of Agriculture. Soil Conservation Service (SCS). *Soil Survey of San Luis Obispo County, California*. 1984.

United States Environmental Protection Agency. *A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals*. Office of Air Quality Planning and Standards, EPA 450/2-81-078. December 12, 1980.